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Virginia Pipelines: A Global Problem With Local Solutions

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Abstract

This paper will address the negative effect that fracturing and natural gas pipelines are causing for the global environment. Growing need for fuel has spiked the demand for natural gas, a nonrenewable resource which is not sustainable and has harmful effects on the environment. Additionally, this paper will expose the risk associated with two proposed pipelines which are intended to cross through the Commonwealth of Virginia. If constructed, the pipelines could cause serious damage to Virginia's delicate ecosystems, endanger native species and interfere with the livelihood of residents. This paper also proposes local solutions to halt construction of the pipelines and reduce Virginia's dependence on natural gas and other nonrenewable natural resources.

Virginia Pipelines

The world relies heavily on natural gas as a resource for power in the commercial, industrial and residential sectors. Currently, there are proposals for two pipelines that would start in West Virginia and bring natural gas to Virginia and North Carolina. While natural gas pipelines have many benefits, their construction has been delayed due to push back from environmental agencies, interest groups and concerned citizens. Natural gas and its associated pipelines can be extremely detrimental to the environment, geography and the livelihood of the people in the areas surrounding the production sites. The pipelines would pollute waterways, displace wildlife and seize land from Virginia's residents.

Natural Gas and Pipelines

Households and businesses across the globe rely on natural gas for energy. According to The US Energy Information Administration (2018), “Natural gas is a fossil energy source that formed deep beneath Earth's surface. Natural gas contains many different compounds. The largest component of natural gas is methane” (“What is Natural Gas?” para.1) . Natural gas is obtained through vertical or horizontal fracturing, or “fracking”, of deposited beds of sedimentary rock. Hydraulic pressure is then used to force the natural gas from deep under the crust to Earth’s surface through cracks made from drilling. The gas is then captured and processed to remove impurities before being delivered through a series of pipelines that can span multiple states. The main pipes are large in diameter and feed into smaller service lines that deliver the resource to consumers (US Energy, 2018 para. 6.). This makes natural gas one of the most convenient resources.

Two companies are in the procress of securing legal permits to construct pipelines in Virginia. The Atlantic Coast Pipeline, which is controlled by Dominion Energy is proposed to span 600 miles from West Virginia, across Virginia, to the Chesapeake Bay and into Eastern North Carolina (ACP, (n.d), para. 4). The second is the Mountain Valley pipeline, which is to be operated and owned by the Mountain Valley Pipeline, LLC. If constructed it would span 303 miles from West Virginia, into North West Virginia and end in the southern region of the state (USGS, (n.d), para.1). These two controversial pipeline projects have roused concern amongst Virginia residents and government agencies.

Benefits of the Pipelines

Virginia, and the rest of the United States, is in a constant need for energy resources. The use of Natural gas has skyrocketed because it is the cheapest source of fuel and is convenient for the consumer. It also provides energy when the sun is not shining or the wind is not blowing. According to Dominion Energy, the natural gas pipeline has many benefits. The construction would stimulate economic growth in Virginia by providing thousands of jobs. The power company also claims that a pipeline would decrease the cost of energy for consumers. While natural gas still emits air pollution, it is important to note that it burns cleaner and is safer than other non-renewable resources such as petroleum and coal ("Atlantic Coast Pipeline" Para. 1). The Mountain Valley Pipeline Corporation (n.d) boasts similar benefits claiming that "Pipelines are the safest way to transport natural gas over long distances (para. 2)". Natural gas is beneficial because it is better for the environment than coal and petroleum production. It is also convenient, reliable and cost effective. However, the convenience of natural gas comes at a high cost.

Dangers of the Pipeline

The construction of the pipeline would undoubtedly have harmful effects on Virginia's ecosystems, geography and citizens. The two pipelines would combine for a total of 903 miles of construction as the energy companies imbed the steel pipes into the Earth. This construction would cross many important waterways and ecosystems, displacing many types of animals and possibly contaminating drinking water. Construction is also known to speed up the process of erosion due to displacement of vegetation at the construction sites. Plants play an important role in Virginia's delicate ecosystem; providing shelter and food for animals. Ground vegetation also acts as a filtration system for water runoff before it enters streams, rivers and lakes. Without these natural barriers, it is increasingly likely contaminants from the natural gas production process would end up in Virginia waterways.

Construction of the Mountain Valley Pipeline began in the summer of 2018 but was put on hold by The Federal Energy Regulatory Commission who was not convinced the plans for the pipelines were sufficient and they could undermine the safety of local residents (Bupert, Sanner, Sligh, 2018). Due to heavy rains and inadequate erosion control at the construction sites, the surrounding areas suffered mudslides and flooding. The nearby Roanoke River even showed signs of pollution caused by upstream construction runoff (p.1). Even at its earliest stages, the pipelines prove to be destructive to Virginia's environmental health and the wellbeing of its residents.

Despite precautions, there is always a chance that damage to the pipeline would cause a leak. Pipelines may become damaged in many ways, one of which is through seismic disruption. When an earthquake occurs near a pipeline there is a risk of damaging a pipe which could result in leakage, therefore resulting in damage to the environment. In 1994 an earthquake ruptured an underground pipeline near the Santa Clara River in Colorado, resulting in irreversible

consequences to the once flourishing environment (Tsinidis, 2019, para. 2)**.** Virginia is not immune to seismic disturbances; in August of 2011 the state was jarred by a 5.8 magnitude earthquake. Damages were reported from Charleston, South Carolina, over 600 miles away. The epicenter of the quake was in Mineral, Virginia which is less than 60 miles from the proposed Atlantic Coast Pipeline. (USGS, Para 1-4 ; APC " Buckingham Compressor Station"). While Virginia is not on an active fault, the possibility of earthquakes would present a grave threat to the structural stability of the pipelines, and the results of a Natural Gas leak can be catastrophic. Research shows that "Leakage of natural gas pipelines may cause explosions and fires, resulting in casualties, environmental damage, and material loss **(Shan**, Liu, & Sun. (2017) Para. 1)"**.** In the event of a leak, the consequences for the state would be grave.

Water contamination also poses a great risk. If natural gas chemicals entered into Virginia's waterways, both humans and animals could be harmed. (Union of Concerned Scientists. 2013) Spillage from natural gas pipelines contains methane which when consumed causes health problem. This raises concern for communities near the proposed pipelines whose drinking water could become contaminated (para 2.). Water contamination would also reduce the population sensitive aquatic species, such as the Brook Trout, which is native to Virginia's Appalachian region.

An experiment was conducted by the USDA to analyze the effects of natural gas pipelines on the environment (Adams, M. B., & Edwards, P. J. , 2011). A natural gas well and pipeline were installed into the Fernow Experimental forest in West Virginia. Scientist closely monitored the flora and the results were devastating. Construction caused an increase in erosion due to the excavation of trees and other vegetation. Barriers were implemented in attempt to minimize the impact, but they were rendered useless to the overwhelming build up of silt

("Erosion", para.1). Additionally, there was visible damage caused to the flora of the Appalachian Hardwood Forest. The canopies near the pipeline site experienced premature leaf fall. Other vegetation was also noticeably harmed. Plants in the area "showed symptoms of damage; discolored or damaged foliage, loss of foliage ("Vegetation Condition", Para 1)". It can be assumed that the results would be similarly detrimental to the Appalachian Hardwood forests in Virginia.

The pipelines would disturb multiple National Forests including the Blue Ridge Parkway, the Great Eastern Trail, and the Appalachian Trail (Sierra Club, (n.d), Para. 8). All of which are home to breathtaking landscapes, historic rock formations and sensitive species of plants and animals. Construction within the national forests would reduce habitat for the gray bat and the Shenandoah salamander, two of the states endangered species (Special Status, 2018, p.1,2). Virginia's national parks attract visitors who come to enjoy the peace of nature, not the noise and pollution of a construction site. The pipelines would undoubtedly decrease the revenue from tourism which is used to protect and maintain the Commonwealth's important forests.

The pipelines not only pose the risk of environmental and health problems, but they would also take land from Virginia's residents. The Sierra Club (2018), which actively lobbies against the Virginia pipelines, put out a statement saying that "The pipelines cross through the rural Appalachia and Piedmont regions of Virginia. Properties crossed by the pipelines include a disproportionate number of low income, elderly landowners with few resources to challenge the taking of their properties…this is a clear case of environmental injustice ("Environmental Injustice"). While the power companies are claiming to help Virginia communities they are targeting vulnerable residents who are unable to fight back to save their lands and protect their health.

In Dominion's proposed plans for the Atlantic Coast pipeline, there are blueprints for a compression station to be erected in Buckingham County, Virginia (ACP, (n.d) para.1), which is a predominately African American community, rich with history. The compressor station is a clear case of power companies trying to take advantage of marginalized citizens, such as minorities. The community however has not waved a white flag. The residents believe that the proposed project is hazardous to their community and have mobilized support against Dominion Energy and the pipeline, even garnering the support of former Vice President Al Gore who spoke at a town hall meeting. The former vice president is completely against the pipeline saying that it "should be canceled," because " It is an environmental injustice and it's not too much to say environmental racism located in this historically black community." (Freedman, 2019, para.9) . Residents of affected localities do not want to be subjected to the dangers a potential pipeline would bring and they are pushing back against the powerful companies.

Local Solutions

Fracking and the subsequent pipelines used to transport natural gas have become a problem wreaking havoc on the global environment. With climate change looming in the future, it is time that Virginia's local governments and citizens step in to stop the pipelines in order to protect its people, wildlife and natural wonders.

There is no doubt that Virginia relies heavily on natural gas. Virginia Energy Sense (2016) reported that 41.6% of Virginia's power comes from natural gas, while only 5.1% of its power is derived from hydroelectric and other renewable sources (para.1). Instead of investing in the pipelines Virginia should be supporting green energy projects, like the Spotsylvania Solar farm, which is proposing a plan that would create 500 megawatt of renewable energy in the form of solar power. The farm would generate enough power to "offset approximately 825,000 metric

tons of carbon dioxide (CO2) per year" (Spotsylvania Solar, para.1). The project has become a source of debate, as Spotsylvania residents do not want rural farmlands turned into solar fields. While solar panels may not be the most appealing visually, the marginal social benefits of renewable power outweighs the social cost of their aesthetic. This local project is on the right path to fixing Virginia's dependence on natural gas and would begin to decrease the need for dangerous pipelines.

Additionally, it is the right and duty of Virginia citizens to voice their concerns. Constituents can write to their senators, Tim Kaine and Mark Warner or to the Virginia Governor, Ralph Northam asking them to push back against the power companies and say no to pipelines. There are also many existing petitions against their construction that residents can sign online or in person.

Residents are accountable for protecting their home state. Virginia is for lovers, so it is time to stand up and show love for the environment. Say no to pipelines in order to: preserve the bountiful wildlife, respect the gradual slopes of the Appalachian trail, protect the rolling hills and generational farmlands of the piedmont region and to defend against polluting the pristine waters of the Chesapeake.

Conclusion

Virginia has turned to natural gas, instead of safer, renewable resources to fulfill the state's growing need for power. Despite some benefits, the pipeline projects pose a great threat to the Commonwealth, its environment, wildlife and citizens. The construction would undoubtedly displace wildlife, pollute important waterways and take land from state residents. The best solution is to stop the pipeline projects and invest in the greener sources of energy, such as solar power. Virginia needs to become a more eco friendly state in order to protect its people and its

environment. The effects of fracking and natural gas pipelines are a growing problem for the global environment. By repurposing the efforts intended for the pipelines, into harnessing renewable energy resources, Virginia would be making a big step toward a more sustainable and eco-friendly future.

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